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MUNICIPAL POLICE OFFICERS'

RETIREMENT SYSTEM

ACTUARIAL VALUATION

AS OF

JULY 1, 1988

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ACTUARIAL CONSULTANTS

TABLE OF CONTENTS

	Page
SECTION I	
Introduction	1
Actuarial Certification	1
SECTION II	
Analysis of Valuation	2
SECTION III	
Schedule 1 - Normal Cost Allocation	4
Schedule 2 - Present Value of Benefits	5
Schedule 3 - Liability Allocation and Statutory Funding	6
Schedule 4 - Unfunded Liability Amortization Schedule	7
Schedule 5 - Comparison of Valuations	8
Schedule 6 -	
Table 1 - Number of Active Members	11
Table 2 - Average Salaries of Active Members	12
Table 3 - Annual Salaries of Active Members	13
Table 4 - Summary of Retirees	14
Table 5 - Summary of Disabled	15
Table 6 - Summary of Survivors	16
SECTION IV	
Actuarial Funding Method and Assumptions	17
SECTION V	
Summary of Benefit Provisions	21

SECTION I

INTRODUCTION

An actuarial valuation of the Municipal Police Officers' Retirement System of the State of Montana has been completed as of July 1, 1988. This valuation was authorized by the Public Employees' Retirement Board under Section 19-9-504, MCA The purpose of the valuation was to determine the financial position of the fund, the normal cost, and the unfunded accrued liability based upon present and prospective assets and liabilities of the system as of July 1, 1988.

Section II presents an analysis of the results of the actuarial valuation. The numerical findings and membership data supporting this analysis are shown in Section III.

In conducting the actuarial valuation, certain assumptions were made as to the future experience of the system. A summary and discussion of each of the assumptions is contained in Section IV.

The valuation is based upon the Municipal Police Officers' Retirement Act and incorporates all amendments as of July 1, 1988. A summary of the major provisions of the Act is contained in Section V.

ACTUARIAL CERTIFICATION

The results of the actuarial valuation shown in this report are based upon information provided by the Public Employees' Retirement Division regarding plan participants, plan assets and other matters. The values have been calculated on the basis of actuarial assumptions which, in my opinion, are appropriate for purposes of this valuation.

This valuation has been prepared in accordance with generally accepted actuarial principles and practices and, to the best of my knowledge, fairly reflects the actuarial position of the Municipal Police Officers' Retirement System as of July 1, 1988.

Alton P. Hendrickson
Member, American Academy
of Actuaries

SECTION II

ANALYSIS OF VALUATION

Results of Valuation

An actuarial valuation as of July 1, 1988 has been conducted for the Municipal Police Officers' Retirement System. This valuation has determined that the percentage of each member's salary required to fund the benefits as they accrue in the future is 20.641%. The regular contribution rate of 35.404% allows 14.763% to be applied to the unfunded past service liability. This percentage is sufficient to amortize the unfunded past service liability over a period of 29.51 years. This period has decreased from 33.60 years in 1986.

An amortization schedule has been prepared which will fund the liability as of July 1, 1984 over a remaining period of 36 years. The liability attributable to 1986 will be amortized over a remaining period of 38 years. A new liability of -$2,351,032 was determined as of July 1, 1988. This will be amortized over a 40-year period. The total contribution rate as a percentage of salary required to meet this schedule is 33.340%. This is a decrease from the required rate of 34.021% in 1986. The schedule is illustrated on page 7.

The variations between this valuation and that of July 1, 1986 are the results of the experience of the Municipal Police Officers' Retirement System versus the expected, as well as a change in the actuarial assumptions.

Actuarial Modifications

A report was prepared on noneconomic actuarial assumptions as of June 30, 1987. This report recommended changes in the mortality, disability, withdrawal and retirement rates assumptions. These assumptions were approved by the board as discussed below.

a. Mortality Rates. Since 1978, the basis for mortality assumptions had been the 1971 Group Annuity Mortality Table. These rates were set back one year to reflect increased longevity. The new mortality basis is the 1983 Group Annuity Mortality Table which reflects recent experience on a national basis. This table is more conservative than the previous basis and anticipates increased longevity.

   This change increased the system's liability by $.8 million and increased the funding period by .9 years.

b. Disability. Previous disability rate assumptions were based upon rates published by the Railroad Retirement Board in its seventh valuation of its retirement system. These rates anticipated disabilities higher than actually experienced by the Public Employees' Retirement System. The new basis is the 1983 Disability Table which anticipates fewer disabilities.

This change decreased the system's liability by $.1 million and decreased the funding period .2 years.

c. The future salary increase assumption continues at 6 1/2% per annum. No provision was made for a select rate at a lower level for the next few years. Also, the meritorious and longevity increase assumption of 3/4 of 1% has been eliminated. The net impact of this change was a decrease in the system's liability of $1.4 million and a reduction in the funding period of 3.9 years.

The overall effect of the actuarial assumption modifications was a decrease in the system's liability of $.7 million and a reduction in the funding period of 3.4 years. Had these changes not been made, the funding of the unfunded liability would have occurred over a period of 33.45 years compared to 29.51 as determined by this valuation.

Summary of Data

The active membership declined from 436 members to 427 members during the biennium with an annual payroll of $9.8 million. There are 284 retired members, 89 disabled members and 27 individuals receiving survivor benefits. The total annual benefit payout as of July 1, 1988 was $4.1 million.

Conclusion

The funding of the Municipal Police Officers' Retirement System continues to improve. This improvement is partially the result of members employed after July 1, 1979 contributing 7 1/2% of salary in comparison with the 6% contributed by members hired prior to that date. The number of police officers remains relatively constant among 13 of the 16 participating cities. Butte and Great Falls declined by 3 and 6 officers, respectively while Helena increased by 5. The assets have grown by over 28% and contributions appear adequate.

SECTION III

Municipal Police Officers' Retirement System

SCHEDULE 1

NORMAL COST ALLOCATION

(1)	Normal Cost Contribution Rate:	
	(a) Retirement	18.546%
	(b) Death	0.623
	(c) Disability	1.083
	(d) Withdrawals	0.389
	(e) Total Rate	20.641%

(2)	Present Value of Future Salaries Of Current Members	$ 87,829,582
(4)	Present Value of Future Normal Costs For Current Members (1(e) * (2))	$ 18,128,904

Municipal Police Officers' Retirement System

SCHEDULE 2

PRESENT VALUE OF BENEFITS

(1)	Present Value of Benefits - Inactive Members	
	(a) Retirement	$ 25,191,010
	(b) Death	2,214,132
	(c) Disability	7,613,223
	(d) Withdrawals	4,190
	(e) Total Inactive	$ 35,022,555
(2)	Present Value of Benefits - Active Members	
	(a) Retirement	$ 43,509,542
	(b) Death	986,376
	(c) Disability	1,753,532
	(d) Withdrawals	535,378
	(e) Total Active	$ 46,784,828
(3)	Total Liabilities	$ 81,807,383

Municipal Police Officers' Retirement System

SCHEDULE 3

LIABILITY ALLOCATION AND STATUTORY FUNDING

(1)	Unfunded Past Service Liability		
	(a) Present Value of Benefits	$	81,807,383
	(b) Present Value of Future Normal Costs	$	18,128,904
	(c) Fund Assets	$	28,752,152
	(d) Unfunded Liability (a)-(b)-(c)	$	34,926,327
(2)	Contribution Rates Amortized over 29.51 Years		
	(a) Present Value of Salaries During Next 29.51 Years	$	236,580,151
	(b) Unfunded Contribution Rate 1(d)/2(a)		14.763%
	(c) Normal Cost Rate (Schedule 1)		20.641
	(d) Statutory Funding Rate		35.404%

Municipal Police Officers' Retirement System

SCHEDULE 4

UNFUNDED LIABILITY AMORTIZATION SCHEDULE

(1)	1984 Unfunded Past Service Liability Account	
(a)	1984 Liability Account as of 7/1/86	$ 35,559,247
(b)	Interest Charge on Liability Account	5,917,058
(c)	Contributions during Biennium Allocated to Unfunded Liability	3,101,941
(d)	Interest Credit on Contributions	239,222
(e)	1984 Liability Account as of 7/1/88	$ 38,135,142
(2)	1986 Unfunded Past Service Liability Account	
(a)	1986 Liability Account as of 7/1/86	$ -799,840
(b)	Interest Charge on Liability Account	-133,094
(c)	Contributions during Biennium Allocated to Unfunded Liability	-69,770
(d)	Interest Credit on Contributions	-5,381
(e)	1986 Liability Account as of 7/1/88	$ -857,783
(3)	Actuarial Gain/Loss	
(a)	Actual Unfunded Liability (Schedule 3)	$ 34,926,327
(b)	1984 Liability Account as of 7/1/88	38,135,142
(c)	1986 Liability Account as of 7/1/88	-857,783
(d)	1988 Liability Account as of 7/1/88	$ -2,351,032
(4)	Required Contribution Rate	
(a)	Normal Cost Rate (Schedule 1)	20.641%
(b)	Rate to Fund 1984 Liability Account Over 36-Year Period	13.781
(c)	Rate to Fund 1986 Liability Account Over 38-Year Period	-0.297
(d)	Rate to Fund 1988 Liability Account Over 40-Year Period	-0.784
(e)	Total Contribution Rate	33.340%

Municipal Police Officers' Retirement System

SCHEDULE 5

TABLE 1

COMPARISON OF VALUATIONS

	1986	1988
Liability for Future Service	$19,525,955	$18,128,904
Unfunded Liability	$34,759,407	$34,926,327
Years Required to Pay Off Unfunded Liability	33.60	29.51
Assets	$22,354,564	$28,752,152
Normal Cost Rate	21.16%	20.64%
Unfunded Liability Rate	14.11%	14.76%
Total Recommended Rate	35.27%	35.40%
Annual Payroll	$10,240,213	$ 9,789,569
Annual Benefits	$ 3,491,579	$ 4,121,035
Number of Active Members	436	427
Number of Retired Members	256	284
Number of Disabled Members	87	89
Number of Survivor Benefits	25	27

Municipal Police Officers' Retirement System

TABLE 2

MEMBERSHIP COMPARISON

ACTIVE MEMBERS

City	1986 Active Members	1986 Annual Payroll	1988 Active Members	1988 Annual Payroll
Anaconda	16	$ 350,365	16	$ 376,765
Baker	2	$ 71,004	2	$ 51,357
Billings	101	$ 2,499,663	100	$2,402,806
Bozeman	26	$ 614,326	26	$ 613,459
Butte	43	$ 908,430	40	$ 963,644
Glasgow	10	$ 218,651	8	$ 170,253
Glendive	11	$ 240,408	9	$ 170,702
Great Falls	63	$ 1,556,718	57	$1,348,574
Havre	15	$ 321,440	15	$ 285,927
Helena	33	$ 817,277	38	$ 808,216
Kalispell	21	$ 509,510	21	$ 514,608
Lewistown	11	$ 221,637	11	$ 193,050
Livingston	10	$ 201,665	10	$ 179,602
Miles City	15	$ 308,566	15	$ 296,525
Missoula	57	$ 1,367,130	58	$1,395,901
Plains	2	$ 33,423	1	$ 18,180
Total	436	$10,240,213	427	$9,789,569

Municipal Police Officers' Retirement System

TABLE 3

MEMBERSHIP COMPARISON

MEMBERS RECEIVING BENEFITS

City	1986 Inactive Members	1986 Annual Benefit	1988 Inactive Members	1988 Annual Benefit
Anaconda	16	$ 166,192	18	$ 193,413
Baker	1	$ 8,692	1	$ 8,692
Billings	69	$ 683,460	76	$ 809,554
Bozeman	16	$ 153,736	15	$ 149,299
Butte	57	$ 521,494	58	$ 578,665
Glasgow	4	$ 38,247	4	$ 40,119
Glendive	5	$ 47,008	6	$ 57,526
Great Falls	66	$ 647,558	78	$ 837,448
Havre	15	$ 131,580	17	$ 161,150
Helena	25	$ 235,944	26	$ 278,551
Kalispell	16	$ 132,801	18	$ 174,848
Lewistown	11	$ 86,064	10	$ 82,560
Livingston	9	$ 81,923	9	$ 84,831
Miles City	15	$ 120,651	17	$ 146,538
Missoula	43	$ 436,229	47	$ 517,841
Total	368	$ 3,491,579	400	$4,121,035

SCHEDULE 6

TABLE 1

Municipal Police Officers' Retirement System

Number of Active Members

Completed Years of Service	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	OVER 65	Total
0-4	19	51	32	12	4						118
5-9		14	39	25	12	3	1	1			95
10-14			24	56	24	7	2	1	2		116
15-19				20	48	6	6		1		81
20-24					3	4	3	3			13
25-29						1	2				3
30-34							1				1
35-39											
40-UP											
TOTAL	19	65	95	113	91	21	15	5	3		427

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TABLE 2

Municipal Police Officers' Retirement System

Average Salaries of Active Members

Completed Years of Service	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	OVER 65	Total
0-4	17911	19661	20392	18859	17843						19434
5-9		20651	21671	21705	23684	19859	18180	22465			21698
10-14			23391	23618	25417	23676	24396	25495	25711		24012
15-19				25816	27034	24710	28157		23906		26605
20-24					24907	28657	27023	29152			27529
25-29						32271	38504				36426
30-34							27401				27401
35-39											
40-UP											
TOTAL	17911	19874	21675	23078	25691	24784	28093	27083	25109		22926

TABLE 3

Municipal Police Officers' Retirement System

Annual Salaries of Active Members
In Thousands

Completed Years of Service	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	OVER 65	Total
0-4	340	1003	653	226	71						2293
5-9		289	845	543	284	60	18	22			2061
10-14			562	1323	610	166	49	25	51		2786
15-19				516	1298	148	169		24		2155
20-24					75	115	81	87			358
25-29						32	77				109
30-34							27				27
35-39											
40-UP											
TOTAL	340	1292	2060	2608	2338	521	421	134	75		9789

TABLE 4

Municipal Police Officers' Retirement System

Summary of Retirees

Number of Members

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
73	55	46	37	34	15	16	8	284

Total Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
74776	47803	38681	30573	26688	11572	12296	6317	248706

Average Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
1024	869	841	826	785	771	769	790	876

TABLE 5

Municipal Police Officers' Retirement System

Summary of Disabled

Number of Members

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
41	10	12	8	10	6	2	0	89

Total Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
34110	8656	9264	6527	7969	4621	1613	0	72760

Average Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
832	866	772	816	797	770	807	0	818

TABLE 6

Municipal Police Officers' Retirement System

Summary of Survivors

Number of Members

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
17	1	4	0	1	0	1	3	27

Total Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
13920	775	3116	0	809	0	840	2495	21954

Average Monthly Benefit

Age Group								
Under 55	55-59	60-64	65-69	70-74	75-79	80-84	Over 84	Total
819	775	779	0	809	0	840	832	813

SECTION IV

ACTUARIAL FUNDING METHOD AND ASSUMPTIONS

The true cost of the Municipal Police Officers' Retirement System will be determined by its future experience. In determining the financial requirement of the fund, certain assumptions were made as to the expected future experience. This section summarizes the funding method applied as well as the basic assumptions used.

Any variations in the actual experience of the fund from those assumed in this valuation may cause changes in the projected future costs of the fund. It is therefore necessary that the actuarial assumptions be reviewed from time to time with adjustments as experience warrants. It is also important that regular valuations be performed to determine the financial effect of variations between the actual and assumed experience.

The assumptions shown below were based upon the past experience of the fund together with the projections as to future experience.

Funding Method

The method of funding employed is commonly referred to as the entry age normal cost method. This method establishes a normal cost of each fund as well as an unfunded accrued liability. The normal cost is the level percentage of total salaries required to fund the benefits, assuming this percentage has been contributed since each member's entry into the fund.

The unfunded accrued liability represents the excess of the present value of total liabilities over the present assets of the fund and the present value of expected future contributions for the normal cost.

In order to maintain the fund on an actuarially sound basis, the rate of contribution should be such as to meet the normal cost in addition to making progress towards the amortization of the unfunded liability.

DISCUSSION OF ACTUARIAL ASSUMPTIONS

Mortality Rates

The mortality rates for males and females are based upon the 1983 Group Annuity Mortality Table, and apply to both active members and those receiving benefits. These rates have longer life expectancies than the 1971 Group Annuity Table used in the previous valuation.

Disability Rates

The disability rates for males and females are based upon the 1983 Disability Table and anticipate fewer disabilities than the previous rates as published by the Railroad Retirement Board.

Withdrawal Rates

The withdrawal rates are based upon the actual experience of the system as determined in the 1987 withdrawal experience study.

Salary Scale

The rates of salary increase are based upon an assumed compounded growth rate of 6.5% per annum.

Investment Earnings

It was assumed that the investment earnings would be 8% compounded annually.

Administrative Expenses

It was assumed that the system would incur no administrative expenses beyond those provided by investment earnings in excess of 8%.

Termination Benefits

It was assumed that all members terminating with less than twenty years of service would receive an immediate withdrawal of their member contributions with interest. It was further assumed that members with twenty or more years of service would select the most advantageous benefits under the given assumptions.

ILLUSTRATION OF ACTUARIAL ASSUMPTIONS

Mortality Rates

The mortality rates are based upon the 1983 Group Annuity Mortality Table.

Age	Deaths Per 10,000 Male Members	Deaths Per 10,000 Female Members
25	5	3
30	6	3
35	9	5
40	12	7
45	22	10
50	39	16
55	61	25
60	92	42
65	156	71
70	275	124
75	446	240
80	741	429
85	1,148	699

Disability Rates

The disability rates are based upon the 1983 Disability Table.

Age	Disabilities per 10,000 Male Members	Disabilities per 10,000 Female Members
25	1	1
30	2	3
35	3	5
40	6	9
45	12	15
50	20	22
55	51	41
60	105	87

Withdrawal Rates

The withdrawal rates illustrated below reflect the turnover experienced by the Police Officer's Retirement System.

Age	Withdrawals Per 10,000 Active Members
25	648
30	386
35	169
40	39
45	21
50	0

Salary Scale

The salary increases are based upon an assumed compounded growth rate of 6.5% per annum.

Investment Earnings

Future investment earnings are assumed to be 8% compounded annually.

Administrative Expenses

It was assumed that the administrative expenses would be recovered by investment earnings in excess of 8%.

SECTION V

SUMMARY OF BENEFITS AND CONTRIBUTIONS

Effective Date -	July 1, 1927
Member Contributions -	6% of salary for police officers employed prior to July 1, 1979 and 7 1/2% of salary for police officers employed on or after July 1, 1979.
City Contributions -	13.02% of active police officers' salaries, plus any amounts required to fund excess past service liabilities.
State Contributions -	15.06% of active police officers' salaries.
Retirement Benefit -	Minimum service: 20 years Minimum age: a) if first employed on or before July 1, 1975, none b) if first employed after July 1, 1975, age 50 Normal form: Life payments to the member and, upon the member's death, continuing to the surviving spouse. In the event there is no surviving spouse, or the spouse subsequently dies or remarries, payments continue to dependent children, if any. Benefit: 50% of the average monthly salary during the highest 36 consecutive months of earnings plus 1% of the average monthly salary for each additional year of service in excess of 20 years, up to a maximum of 60%.
Disability Benefit -	Greater of 50% of the final average monthly salary or the accrued retirement benefit.
Death Benefit -	50% of the average monthly salary, payable to surviving spouse or minor children.

Termination Benefit -	Prior to completion of 10 years of service, return of accumulated contributions without interest. After completion of 10 years of service, return of accumulated contributions with interest.
Benefit Adjustments -	A supplemental benefit shall be paid to members or beneficiaries who were receiving payments prior to July 1, 1975. The supplemental benefit shall be the amount needed to provide a benefit of 50% of the base salary paid in the previous calendar year to a newly confirmed police officer in the city in which the member was employed. A similar benefit is provided to members who retire after July 1, 1975 but prior to July 1, 1985. This benefit is based on the 1985 salary of a newly confirmed police officer. The fund is reimbursed by the state auditor for the supplemental benefits.